

## Atmospheric Lidar with Cross-Track Scanning, Phase II

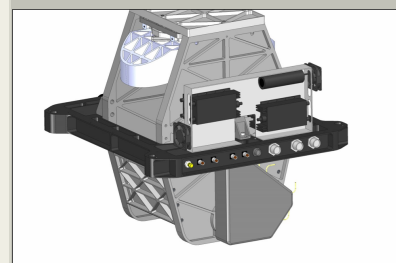
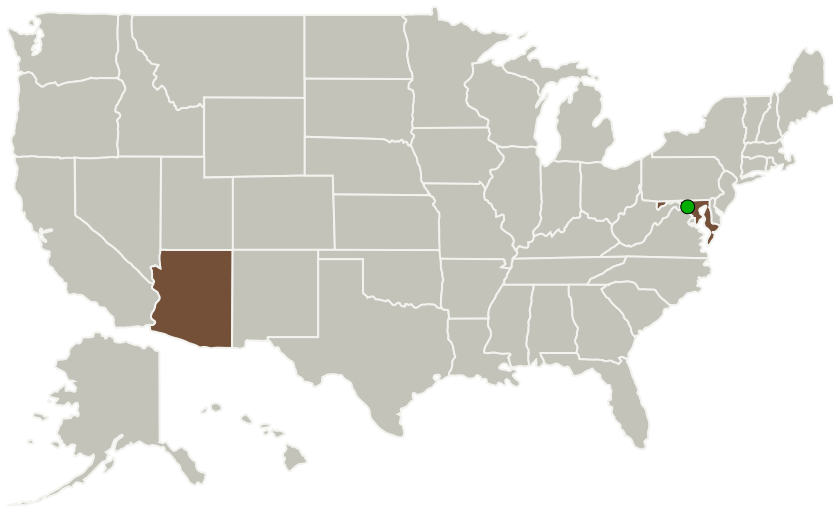
Completed Technology Project (2014 - 2016)



## Project Introduction

An eye-safe, multispectral cross-track scan subsystem with a large receiver aperture and a narrow FOV is proposed for the NASA Cloud Physics Lidar (CPL) to increase the horizontal scan area coverage. The  $\pm 14$  degree cross-track scan capability will cover  $\pm 5$  km from nadir at a 20 km altitude. The cross-track scanner uses a bidirectional scan pattern, which collects 10,000 data points per cross track scan at a 5 kHz transmitter rep rate. Solar background is reduced with narrow bandpass filters and a narrow transmitter linewidth with center wavelength control. The scanner accounts for the return pulse lag angle due to pulse time of flight. The existing CPL vertical resolution is maintained at 30 m. Photon counting SPAD detectors and PMT's are used with photon counting modules and multichannel scalers, which support eye-safe operation. The compact receiver telescope design is achieved with a configuration that uses a fixed primary mirror and a scanning secondary mirror, which directs the return signal through a Coude path to the the detector optics bench. The multispectral lidar uses polarization discrimination on two of the three receiver channels, and the optics design supports a 100 urad receiver Instantaneous Field Of View to minimize the solar background noise.

## Primary U.S. Work Locations and Key Partners



Atmospheric Lidar with Cross-Track Scanning, Phase II

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Litespar, Inc.	Lead Organization	Industry	Tucson, Arizona
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Arizona	Maryland

## Project Transitions

▶ **April 2014:** Project Start

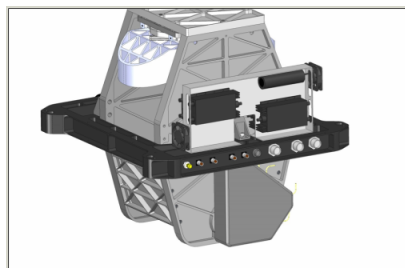
✓ **May 2016:** Closed out

**Closeout Summary:** Atmospheric Lidar with Cross-Track Scanning, Phase II Project Image

**Closeout Documentation:**

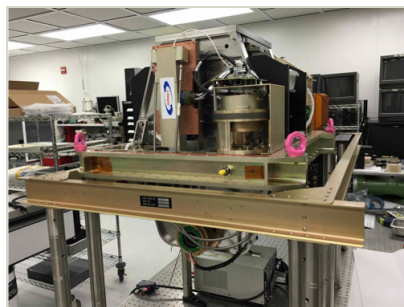
- Final Summary Chart Image(<https://techport.nasa.gov/file/137742>)

## Images



**Briefing Chart Image**

Atmospheric Lidar with Cross-Track Scanning, Phase II  
(<https://techport.nasa.gov/image/134518>)



**Final Summary Chart Image**

Atmospheric Lidar with Cross-Track Scanning, Phase II Project Image  
(<https://techport.nasa.gov/image/128064>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Litespar, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

William L Austin

**Co-Investigator:**

William M Austin

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### Technology Maturity (TRL)

Start: **4**  
Current: **5**  
Estimated End: **5**



### Technology Areas

#### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.5 Lasers

### Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System